

## SEQUENCE LISTING

<110> INSTITUT PASTEUR  
INSTITUT PASTEUR DE TUNIS

<120> GENE ASSOCIATED WITH LEISHMANIA PARASITE VIRULENCE

<130> B4866A -AD/VMA

<140>

<141>

<150> FR 0107985

<151> 2001-06-18

<160> 10

<170> PatentIn Ver. 2.1

<210> 1

<211> 2094

<212> DNA

<213> Leishmania major

<220>

<221> CDS

<222> (241)..(1674)

<223> LmPDI coding sequence (orf)

<400> 1

```

ggcaccagcg gcaccagagt ttctgtactt tattgtcttt ctctattcta cccacacttg 60
cctctctgcg ctctctgtgc ctgtgcgggc gcgcaacgtg cctttctctc cgtattgccc 120
agctgtgagc tgctgcctac tggcaacgtg tacgccattc ccgtttcttg attctggtgc 180
agtgtcagc tctaccctat ttgtattgat accgttttcc ttttcgtttt gcaaagaaaa 240
atg cag cgc tca ttc ctt gtt ttt gtt ctg tgc gcc ctt ctc ttc tgc 288
Met Gln Arg Ser Phe Leu Val Phe Val Leu Cys Ala Leu Leu Phe Cys
  1             5             10             15
gtc gcg tcc gca gag gtg cag gtg gcc act aag gac aac ttt gac aag 336
Val Ala Ser Ala Glu Val Gln Val Ala Thr Lys Asp Asn Phe Asp Lys
          20          25          30
gtc gta atc ggg gat ctc acg ttg gtc aag ttt tat gct ccg tgg tgc 384
Val Val Ile Gly Asp Leu Thr Leu Val Lys Phe Tyr Ala Pro Trp Cys
          35          40          45
ggc cac tgc aag aca ctc gcc ccg gag ttt gta aag gcc gct gac atg 432
Gly His Cys Lys Thr Leu Ala Pro Glu Phe Val Lys Ala Ala Asp Met
          50          55          60
ctg gcc ggc atc gcg acc ctt gca gag gtc gat tgc acc aaa gaa gag 480
Leu Ala Gly Ile Ala Thr Leu Ala Glu Val Asp Cys Thr Lys Glu Glu
          65          70          75          80

```

agc ctt gct gag aag tac gaa atc aag ggg ttc ccc acg ctg tac atc	528
Ser Leu Ala Glu Lys Tyr Glu Ile Lys Gly Phe Pro Thr Leu Tyr Ile	
85 90 95	
ttc cgt aac ggt gag aaa gtg aag atc tac gat ggt ccc cgc act gcc	576
Phe Arg Asn Gly Glu Lys Val Lys Ile Tyr Asp Gly Pro Arg Thr Ala	
100 105 110	
gcc ggc atc gcg tcg tac atg aag gcg cat gtc ggt cca tcg atg aag	624
Ala Gly Ile Ala Ser Tyr Met Lys Ala His Val Gly Pro Ser Met Lys	
115 120 125	
gcc atc tca acg gct gaa gag ctg gag gag ctc aag aag gag act ttc	672
Ala Ile Ser Thr Ala Glu Glu Leu Glu Glu Leu Lys Lys Glu Thr Phe	
130 135 140	
ccg gtg tgc gtg gtg aag aca gcg agc acc gac tcg gag atg gcg tcg	720
Pro Val Cys Val Val Lys Thr Ala Ser Thr Asp Ser Glu Met Ala Ser	
145 150 155 160	
atg ata acc aag gtg gcg gac tct ctc cgc tcg cag atg aac ttt gtg	768
Met Ile Thr Lys Val Ala Asp Ser Leu Arg Ser Gln Met Asn Phe Val	
165 170 175	
ctc gtg acg gat gcg gcc atc tct ccg aat gat gcc atg gag tcg gtt	816
Leu Val Thr Asp Ala Ala Ile Ser Pro Asn Asp Ala Met Glu Ser Val	
180 185 190	
acg gtg tat cgc aag aat gcg gag cgc gag gcg tac acc ggc gct aca	864
Thr Val Tyr Arg Lys Asn Ala Glu Arg Glu Ala Tyr Thr Gly Ala Thr	
195 200 205	
cca atg acg gca gag tcg gtg aag agc ttt ctc acg agt gct gtg ttg	912
Pro Met Thr Ala Glu Ser Val Lys Ser Phe Leu Thr Ser Ala Val Leu	
210 215 220	
gac tac ttt ggc gag ctc ggc cag gag agc ttt cag aag tac atg gaa	960
Asp Tyr Phe Gly Glu Leu Gly Gln Glu Ser Phe Gln Lys Tyr Met Glu	
225 230 235 240	
gcg aac aag gat aaa cct ctt ggg tgg gtg ttc atc gac aag aac acg	1008
Ala Asn Lys Asp Lys Pro Leu Gly Trp Val Phe Ile Asp Lys Asn Thr	
245 250 255	
gat tct gcg ttg aag ggg tca ctt gtg gcg gtg gcg gag aag tac cgc	1056
Asp Ser Ala Leu Lys Gly Ser Leu Val Ala Val Ala Glu Lys Tyr Arg	
260 265 270	
tcg cag gtg ttg cta acc tac att gac ggc gat cag tac cgc ccc gtc	1104
Ser Gln Val Leu Leu Thr Tyr Ile Asp Gly Asp Gln Tyr Arg Pro Val	
275 280 285	
tcg cgc cag ctg ggc att cct gag gat gcg aag ttc ccg gcg ttt gtg	1152
Ser Arg Gln Leu Gly Ile Pro Glu Asp Ala Lys Phe Pro Ala Phe Val	
290 295 300	
gtc gat ttc gag cgc cgc cat cac gtg atg ggg acg gac acc cca gtc	1200
Val Asp Phe Glu Arg Arg His His Val Met Gly Thr Asp Thr Pro Val	
305 310 315 320	

acc tcc gag tct gtc gct gcg ttt gtg gag aag tat gtc aag ggc gag 1248  
 Thr Ser Glu Ser Val Ala Ala Phe Val Glu Lys Tyr Val Lys Gly Glu  
 325 330 335

acg aag cag acc gtg atg tcc gac gcg att ccc gct aag gag acg gtg 1296  
 Thr Lys Gln Thr Val Met Ser Asp Ala Ile Pro Ala Lys Glu Thr Val  
 340 345 350

aac ggc ctc aca acg gtg gtg ggt cag act ttt gcg aag tac acg gac 1344  
 Asn Gly Leu Thr Thr Val Val Gly Gln Thr Phe Ala Lys Tyr Thr Asp  
 355 360 365

ggc aca caa aac gtg atg ctg ctc ttc tac gcg ccg tgg tgc gga cac 1392  
 Gly Thr Gln Asn Val Met Leu Leu Phe Tyr Ala Pro Trp Cys Gly His  
 370 375 380

tgc aag aag ctg cac ccc gtc tac gat aaa gta gcc aag agc ttc gag 1440  
 Cys Lys Lys Leu His Pro Val Tyr Asp Lys Val Ala Lys Ser Phe Glu  
 385 390 395 400

tct gag aat gtg atc att gcg aag atg gat gcc acg acg aac gac ttt 1488  
 Ser Glu Asn Val Ile Ile Ala Lys Met Asp Ala Thr Thr Asn Asp Phe  
 405 410 415

gac cgc gag aag ttt gag gtg tct gga ttt cca acg att tac ttc atc 1536  
 Asp Arg Glu Lys Phe Glu Val Ser Gly Phe Pro Thr Ile Tyr Phe Ile  
 420 425 430

cca gcc ggc aag ccg cca atc gtg tac gag ggt ggc cgc acc gca gac 1584  
 Pro Ala Gly Lys Pro Pro Ile Val Tyr Glu Gly Gly Arg Thr Ala Asp  
 435 440 445

gaa atc cag gtg ttt gtg aag tct cac ctg acc gcc tcc gcc gct cca 1632  
 Glu Ile Gln Val Phe Val Lys Ser His Leu Thr Ala Ser Ala Ala Pro  
 450 455 460

tct ggc ggc cct tcc ggc aac agc gaa gag gaa gat ttg tag 1674  
 Ser Gly Gly Pro Ser Gly Asn Ser Glu Glu Glu Asp Leu  
 465 470 475

gactgcaagg gatgtggcgt ttataggctg ccttgcccttc ccttgctgtt tctatgacgg 1734  
 attaggcttt tttttgttat atgtgggggtg gtcaagagag tgccagggtt ccttctttat 1794  
 atccttgccg tttcttttat tttgcttctt tgtgttgacg tctatgcatg cgtgctgtcg 1854  
 acgactcttt gtcaacctgc gtcctatcta gtagcatcga tgtgaaaaga agagtagagg 1914  
 gaggtaacga tgcgtgcgct ggctgcccgtt ttcattgggag caatttcgag aaggaaaatc 1974  
 ggaaaatgga caggatagcg aaattagcgc aacgacaagg tcgtgcgtct ttctctatcg 2034  
 gtcattaaat ttctgggctt tgtaacaatg aaagaagtca cacaaaaaaa aaaaaaaaaa 2094

&lt;210&gt; 2

&lt;211&gt; 477

&lt;212&gt; PRT

&lt;213&gt; Leishmania major

BEST AVAILABLE COPY

&lt;400&gt; 2

Met Gln Arg Ser Phe Leu Val Phe Val Leu Cys Ala Leu Leu Phe Cys  
 1 5 10 15  
 Val Ala Ser Ala Glu Val Gln Val Ala Thr Lys Asp Asn Phe Asp Lys  
 20 25 30  
 Val Val Ile Gly Asp Leu Thr Leu Val Lys Phe Tyr Ala Pro Trp Cys  
 35 40 45  
 Gly His Cys Lys Thr Leu Ala Pro Glu Phe Val Lys Ala Ala Asp Met  
 50 55 60  
 Leu Ala Gly Ile Ala Thr Leu Ala Glu Val Asp Cys Thr Lys Glu Glu  
 65 70 75 80  
 Ser Leu Ala Glu Lys Tyr Glu Ile Lys Gly Phe Pro Thr Leu Tyr Ile  
 85 90 95  
 Phe Arg Asn Gly Glu Lys Val Lys Ile Tyr Asp Gly Pro Arg Thr Ala  
 100 105 110  
 Ala Gly Ile Ala Ser Tyr Met Lys Ala His Val Gly Pro Ser Met Lys  
 115 120 125  
 Ala Ile Ser Thr Ala Glu Glu Leu Glu Glu Leu Lys Lys Glu Thr Phe  
 130 135 140  
 Pro Val Cys Val Val Lys Thr Ala Ser Thr Asp Ser Glu Met Ala Ser  
 145 150 155 160  
 Met Ile Thr Lys Val Ala Asp Ser Leu Arg Ser Gln Met Asn Phe Val  
 165 170 175  
 Leu Val Thr Asp Ala Ala Ile Ser Pro Asn Asp Ala Met Glu Ser Val  
 180 185 190  
 Thr Val Tyr Arg Lys Asn Ala Glu Arg Glu Ala Tyr Thr Gly Ala Thr  
 195 200 205  
 Pro Met Thr Ala Glu Ser Val Lys Ser Phe Leu Thr Ser Ala Val Leu  
 210 215 220  
 Asp Tyr Phe Gly Glu Leu Gly Gln Glu Ser Phe Gln Lys Tyr Met Glu  
 225 230 235 240  
 Ala Asn Lys Asp Lys Pro Leu Gly Trp Val Phe Ile Asp Lys Asn Thr  
 245 250 255  
 Asp Ser Ala Leu Lys Gly Ser Leu Val Ala Val Ala Glu Lys Tyr Arg  
 260 265 270  
 Ser Gln Val Leu Leu Thr Tyr Ile Asp Gly Asp Gln Tyr Arg Pro Val  
 275 280 285  
 Ser Arg Gln Leu Gly Ile Pro Glu Asp Ala Lys Phe Pro Ala Phe Val  
 290 295 300

Val Asp Phe Glu Arg Arg His His Val Met Gly Thr Asp Thr Pro Val  
 305 310 315 320  
 Thr Ser Glu Ser Val Ala Ala Phe Val Glu Lys Tyr Val Lys Gly Glu  
 325 330 335  
 Thr Lys Gln Thr Val Met Ser Asp Ala Ile Pro Ala Lys Glu Thr Val  
 340 345 350  
 Asn Gly Leu Thr Thr Val Val Gly Gln Thr Phe Ala Lys Tyr Thr Asp  
 355 360 365  
 Gly Thr Gln Asn Val Met Leu Leu Phe Tyr Ala Pro Trp Cys Gly His  
 370 375 380  
 Cys Lys Lys Leu His Pro Val Tyr Asp Lys Val Ala Lys Ser Phe Glu  
 385 390 395 400  
 Ser Glu Asn Val Ile Ile Ala Lys Met Asp Ala Thr Thr Asn Asp Phe  
 405 410 415  
 Asp Arg Glu Lys Phe Glu Val Ser Gly Phe Pro Thr Ile Tyr Phe Ile  
 420 425 430  
 Pro Ala Gly Lys Pro Pro Ile Val Tyr Glu Gly Gly Arg Thr Ala Asp  
 435 440 445  
 Glu Ile Gln Val Phe Val Lys Ser His Leu Thr Ala Ser Ala Ala Pro  
 450 455 460  
 Ser Gly Gly Pro Ser Gly Asn Ser Glu Glu Glu Asp Leu  
 465 470 475

&lt;210&gt; 3

&lt;211&gt; 467

&lt;212&gt; PRT

&lt;213&gt; Artificial sequence

&lt;220&gt;

&lt;223&gt; Description of artificial sequence: recombinant protein

&lt;400&gt; 3

Met Ala Glu Val Gln Val Ala Thr Lys Asp Asn Phe Asp Lys Val Val  
 1 5 10 15  
 Ile Gly Asp Leu Thr Leu Val Lys Phe Tyr Ala Pro Trp Cys Gly His  
 20 25 30  
 Cys Lys Thr Leu Ala Pro Glu Phe Val Lys Ala Ala Asp Met Leu Ala  
 35 40 45  
 Gly Ile Ala Thr Leu Ala Glu Val Asp Cys Thr Lys Glu Glu Ser Leu  
 50 55 60  
 Ala Glu Lys Tyr Glu Ile Lys Gly Phe Pro Thr Leu Tyr Ile Phe Arg  
 65 70 75 80

BEST AVAILABLE COPY

Asn Gly Glu Lys Val Lys Ile Tyr Asp Gly Pro Arg Thr Ala Ala Gly  
85 90 95

Ile Ala Ser Tyr Met Lys Ala His Val Gly Pro Ser Met Lys Ala Ile  
100 105 110

Ser Thr Ala Glu Glu Leu Glu Glu Leu Lys Lys Glu Thr Phe Pro Val  
115 120 125

Cys Val Val Lys Thr Ala Ser Thr Asp Ser Glu Met Ala Ser Met Ile  
130 135 140

Thr Lys Val Ala Asp Ser Leu Arg Ser Gln Met Asn Phe Val Leu Val  
145 150 155 160

Thr Asp Ala Ala Ile Ser Pro Asn Asp Ala Met Glu Ser Val Thr Val  
165 170 175

Tyr Arg Lys Asn Ala Glu Arg Glu Ala Tyr Thr Gly Ala Thr Pro Met  
180 185 190

Thr Ala Glu Ser Val Lys Ser Phe Leu Thr Ser Ala Val Leu Asp Tyr  
195 200 205

Phe Gly Glu Leu Gly Gln Glu Ser Phe Gln Lys Tyr Met Glu Ala Asn  
210 215 220

Lys Asp Lys Pro Leu Gly Trp Val Phe Ile Asp Lys Asn Thr Asp Ser  
225 230 235 240

Ala Leu Lys Gly Ser Leu Val Ala Val Ala Glu Lys Tyr Arg Ser Gln  
245 250 255

Val Leu Leu Thr Tyr Ile Asp Gly Asp Gln Tyr Arg Pro Val Ser Arg  
260 265 270

Gln Leu Gly Ile Pro Glu Asp Ala Lys Phe Pro Ala Phe Val Val Asp  
275 280 285

Phe Glu Arg Arg His His Val Met Gly Thr Asp Thr Pro Val Thr Ser  
290 295 300

Glu Ser Val Ala Ala Phe Val Glu Lys Tyr Val Lys Gly Glu Thr Lys  
305 310 315 320

Gln Thr Val Met Ser Asp Ala Ile Pro Ala Lys Glu Thr Val Asn Gly  
325 330 335

Leu Thr Thr Val Val Gly Gln Thr Phe Ala Lys Tyr Thr Asp Gly Thr  
340 345 350

Gln Asn Val Met Leu Leu Phe Tyr Ala Pro Trp Cys Gly His Cys Lys  
355 360 365

Lys Leu His Pro Val Tyr Asp Lys Val Ala Lys Ser Phe Glu Ser Glu  
370 375 380

Asn Val Ile Ile Ala Lys Met Asp Ala Thr Thr Asn Asp Phe Asp Arg  
385 390 395 400

Glu Lys Phe Glu Val Ser Gly Phe Pro Thr Ile Tyr Phe Ile Pro Ala  
 405 410 415

Gly Lys Pro Pro Ile Val Tyr Glu Gly Gly Arg Thr Ala Asp Glu Ile  
 420 425 430

Gln Val Phe Val Lys Ser His Leu Thr Ala Ser Ala Ala Pro Ser Gly  
 435 440 445

Gly Pro Ser Gly Asn Ser Glu Glu Glu Asp Leu Leu Glu His His His  
 450 455 460

His His His  
 465

<210> 4  
 <211> 497  
 <212> PRT  
 <213> T. brucei

<400> 4

Met Arg Ala Ile Phe Leu Val Ala Leu Ala Leu Ala Thr Met Arg Glu  
 1 5 10 15

Ser Thr Ala Glu Ser Leu Lys Leu Thr Lys Glu Asn Phe Asn Glu Thr  
 20 25 30

Ile Ala Lys Ser Glu Ile Phe Leu Val Lys Phe Tyr Val Asp Thr Cys  
 35 40 45

Gly Tyr Cys Gln Met Leu Ala Pro Glu Trp Glu Lys Ala Ala Asn Glu  
 50 55 60

Thr Ile Asp Asn Ala Leu Met Gly Glu Val Asp Cys His Ser Gln Pro  
 65 70 75 80

Glu Leu Ala Ala Asn Phe Ser Ile Arg Gly Tyr Pro Thr Ile Ile Leu  
 85 90 95

Phe Arg Asn Gly Lys Glu Ala Glu His Tyr Gly Gly Ala Arg Thr Lys  
 100 105 110

Asp Asp Ile Ile Lys Tyr Ile Lys Ala Asn Val Gly Pro Ala Val Thr  
 115 120 125

Pro Ala Ser Asn Ala Glu Glu Val Thr Arg Ala Lys Glu Glu His Asp  
 130 135 140

Val Val Cys Val Gly Leu Thr Ala Asn Asn Ser Thr Ser Leu Ser Thr  
 145 150 155 160

Thr Leu Ala Glu Ala Ala Gln Ser Phe Arg Val Ser Leu Lys Phe Phe  
 165 170 175

Glu Ala Glu Pro Lys Leu Phe Pro Asp Glu Lys Pro Glu Thr Ile Val  
 180 185 190

Val Tyr Arg Lys Gly Gly Glu Lys Glu Val Tyr Asp Gly Pro Met Glu  
 195 200 205  
 Val Glu Lys Leu Thr Glu Phe Leu Gln Ile Ser Arg Val Ala Phe Gly  
 210 215 220  
 Gly Glu Ile Thr Pro Glu Asn Tyr Gln Tyr Tyr Ser Val Ile Lys Arg  
 225 230 235 240  
 Pro Val Gly Trp Ala Met Val Lys Pro Asn Glu Thr Ala Ser Ile Glu  
 245 250 255  
 Leu Lys Glu Ser Leu Thr Glu Val Gly Lys Lys Met Arg Ser His Met  
 260 265 270  
 Val Val Leu Trp Val Asn Ile Ser Lys His Pro Val Trp Arg Asp Phe  
 275 280 285  
 Gly Val Pro Glu Asp Ala Lys Tyr Pro Ala Phe Leu Ala Ile His Trp  
 290 295 300  
 Gly Ala Asn Tyr Leu His Ser Thr Ala Glu Val Val Thr Arg Glu Ser  
 305 310 315 320  
 Leu Glu Lys Phe Ile Leu Glu Phe Ala Ala Gly Arg Val Glu Pro Thr  
 325 330 335  
 Ile Lys Ser Leu Pro Val Pro Glu Val Glu Thr Val Asp Gly Lys Thr  
 340 345 350  
 Thr Ile Val Ala Lys Thr Met Gln Lys His Leu Thr Ser Gly Lys Asp  
 355 360 365  
 Met Leu Ile Leu Phe Phe Ala Pro Trp Cys Gly His Cys Lys Asn Phe  
 370 375 380  
 Ala Pro Thr Phe Asp Lys Ile Ala Lys Glu Phe Asp Ala Thr Asp Leu  
 385 390 395 400  
 Ile Val Ala Glu Leu Asp Ala Thr Ala Asn Tyr Val Asn Ser Ser Thr  
 405 410 415  
 Phe Thr Val Thr Ala Phe Pro Thr Val Phe Phe Val Pro Asn Gly Gly  
 420 425 430  
 Lys Pro Val Val Phe Glu Gly Glu Arg Ser Phe Glu Asn Val Tyr Glu  
 435 440 445  
 Phe Val Arg Lys His Val Thr Thr Phe Lys Val Ser Glu Lys Pro Ala  
 450 455 460  
 Asn Val Thr Glu Glu Lys Lys Ser Glu Glu Glu Asn Lys Ser Ser Lys  
 465 470 475 480  
 Ser Asn Glu Ser Asn Asp Ser Asn Glu Ser Asn Val Asp Lys Gln Asp  
 485 490 495  
 Leu



<210> 5  
 <211> 502  
 <212> PRT  
 <213> H. jecorina

<400> 5

Met Gln Gln Lys Arg Leu Thr Ala Ala Leu Val Ala Ala Leu Ala Ala  
 1 5 10 15

Val Val Ser Ala Glu Ser Asp Val Lys Ser Leu Thr Lys Asp Thr Phe  
 20 25 30

Asn Asp Phe Ile Asn Ser Asn Asp Leu Val Leu Ala Glu Ser Phe Ala  
 35 40 45

Pro Trp Cys Gly His Cys Lys Ala Leu Ala Pro Glu Tyr Glu Glu Ala  
 50 55 60

Ala Thr Thr Leu Lys Asp Lys Ser Ile Lys Leu Ala Lys Val Asp Cys  
 65 70 75 80

Val Glu Glu Ala Asp Leu Cys Lys Glu His Gly Val Glu Gly Tyr Pro  
 85 90 95

Thr Leu Lys Val Phe Arg Gly Leu Asp Lys Val Ala Pro Tyr Thr Gly  
 100 105 110

Pro Arg Lys Ala Asp Gly Ile Thr Ser Tyr Met Val Lys Gln Ser Leu  
 115 120 125

Pro Ala Val Ser Ala Leu Thr Lys Asp Thr Leu Glu Asp Phe Lys Thr  
 130 135 140

Ala Asp Lys Val Val Leu Val Ala Tyr Ile Ala Ala Asp Asp Lys Ala  
 145 150 155 160

Ser Asn Glu Thr Phe Thr Ala Leu Ala Asn Glu Leu Arg Asp Thr Tyr  
 165 170 175

Leu Phe Gly Gly Val Asn Asp Ala Ala Val Ala Glu Ala Glu Gly Val  
 180 185 190

Lys Phe Pro Ser Ile Val Leu Tyr Lys Ser Phe Asp Glu Gly Lys Asn  
 195 200 205

Val Phe Ser Glu Lys Phe Asp Ala Glu Ala Ile Arg Asn Phe Ala Gln  
 210 215 220

Val Ala Ala Thr Pro Leu Val Gly Glu Val Gly Pro Glu Thr Tyr Ala  
 225 230 235 240

Gly Tyr Met Ser Ala Gly Ile Pro Leu Ala Tyr Ile Phe Ala Glu Thr  
 245 250 255

Ala Glu Glu Arg Glu Asn Leu Ala Lys Thr Leu Lys Pro Val Ala Glu  
 260 265 270

Lys Tyr Lys Gly Lys Ile Asn Phe Ala Thr Ile Asp Ala Lys Asn Phe  
 275 280 285

Gly Ser His Ala Gly Asn Ile Asn Leu Lys Thr Asp Lys Phe Pro Ala  
 290 295 300

Phe Ala Ile His Asp Ile Glu Lys Asn Leu Lys Phe Pro Phe Asp Gln  
 305 310 315 320

Ser Lys Glu Ile Thr Glu Lys Asp Ile Ala Ala Phe Val Asp Gly Phe  
 325 330 335

Ser Ser Gly Lys Ile Glu Ala Ser Ile Lys Ser Glu Pro Ile Pro Glu  
 340 345 350

Thr Gln Glu Gly Pro Val Thr Val Val Val Ala His Ser Tyr Lys Asp  
 355 360 365

Ile Val Leu Asp Asp Lys Lys Asp Val Leu Ile Glu Phe Tyr Thr Pro  
 370 375 380

Trp Cys Gly His Cys Lys Ala Leu Ala Pro Lys Tyr Asp Glu Leu Ala  
 385 390 395 400

Ser Leu Tyr Ala Lys Ser Asp Phe Lys Asp Lys Val Val Ile Ala Lys  
 405 410 415

Val Asp Ala Thr Ala Asn Asp Val Pro Asp Glu Ile Gln Gly Phe Pro  
 420 425 430

Thr Ile Lys Leu Tyr Pro Ala Gly Asp Lys Lys Asn Pro Val Thr Tyr  
 435 440 445

Ser Gly Ala Arg Thr Val Glu Asp Phe Ile Glu Phe Ile Lys Glu Asn  
 450 455 460

Gly Lys Tyr Lys Ala Gly Val Glu Ile Pro Ala Glu Pro Thr Glu Glu  
 465 470 475 480

Ala Glu Ala Ser Glu Ser Lys Ala Ser Glu Glu Ala Lys Ala Ser Glu  
 485 490 495

Glu Thr His Asp Glu Leu  
 500

<210> 6

<211> 488

<212> PRT

<213> C. elegans

<400> 6

Met Ile Trp Val Gln Ala Ala Leu Val Ala Ser Phe Leu Ala Phe Ala  
 1 5 10 15

Ser Ala Gly Gly Ala Val Leu Glu Tyr Thr Asp Gly Asn Phe Asp Asp  
 20 25 30

Leu Ile Gln Thr His Asp Ile Ala Leu Val Lys Phe Tyr Ala Pro Trp  
 35 40 45  
 Cys Gly His Cys Lys Lys Ile Ala Pro Glu Tyr Glu Arg Ala Ala Pro  
 50 55 60  
 Lys Leu Ala Ser Asn Asp Pro Pro Val Ala Leu Val Lys Val Asp Cys  
 65 70 75 80  
 Thr Thr Glu Lys Thr Val Cys Asp Lys Phe Gly Val Lys Gly Phe Pro  
 85 90 95  
 Thr Leu Lys Ile Phe Arg Asn Gly Val Pro Ala Gln Asp Tyr Asp Gly  
 100 105 110  
 Pro Arg Asp Ala Asp Gly Ile Val Lys Phe Met Arg Gly Gln Ser Gly  
 115 120 125  
 Pro Ser Ser Lys Glu Leu Lys Thr Val Ala Glu Phe Glu Lys Phe Thr  
 130 135 140  
 Gly Gly Asp Glu Asn Val Val Ile Gly Phe Phe Glu Ser Glu Ser Lys  
 145 150 155 160  
 Leu Lys Asp Ser Tyr Leu Lys Val Ala Asp Thr Glu Arg Asp Arg Phe  
 165 170 175  
 Ser Phe Ala His Thr Ser Asn Lys Asp Ile Ile Lys Lys Ala Gly Tyr  
 180 185 190  
 Ser Asp Asp Val Val Val Phe Val Pro Lys Lys Leu His Asn Lys Phe  
 195 200 205  
 Asp Thr Asn Glu Phe Lys Tyr Asp Gly Asn Tyr Asp Thr Asp Lys Ile  
 210 215 220  
 Lys Asn Phe Leu Val His Glu Thr Val Gly Phe Ala Gly Ile Arg Thr  
 225 230 235 240  
 Gln Gly Asn Leu Phe Gln Phe Glu Gln Lys Pro Ile Val Ile Val Tyr  
 245 250 255  
 Tyr Asn Val Asp Tyr Val Lys Asp Pro Lys Gly Ser Asn Tyr Trp Arg  
 260 265 270  
 Asn Arg Val Leu Lys Val Ala Gln Asn Tyr Lys Arg Lys Val Gln Phe  
 275 280 285  
 Ala Val Ser Asn Lys Glu Glu Phe Ser Ser Glu Ile Glu Thr Asn Gly  
 290 295 300  
 Leu Gly Glu Arg Lys Asp Ser Asp Lys Pro Ile Val Ala Ile Leu Thr  
 305 310 315 320  
 Asn Glu Gly Lys Tyr Pro Met Asp Gln Glu Phe Ser Val Asp Asn Leu  
 325 330 335  
 Gln Gln Phe Val Asp Glu Val Leu Ala Gly Asn Ala Glu Pro Tyr Met  
 340 345 350

Lys Ser Glu Pro Ile Pro Asp Glu Gln Gly Asp Val Lys Val Ala Val  
 355 360 365

Gly Lys Asn Phe Lys Glu Leu Ile Met Asp Ala Asp Lys Asp Val Leu  
 370 375 380

Ile Glu Phe Tyr Ala Pro Trp Cys Gly His Cys Lys Ser Leu Ala Pro  
 385 390 395 400

Lys Tyr Glu Glu Leu Ala Glu Lys Leu Asn Lys Glu Asp Val Ile Ile  
 405 410 415

Ala Lys Met Asp Ala Thr Ala Asn Asp Val Pro Pro Met Phe Glu Val  
 420 425 430

Arg Gly Phe Pro Thr Leu Phe Trp Leu Pro Lys Asn Ala Lys Ser Asn  
 435 440 445

Pro Ile Pro Tyr Asn Gly Gly Arg Glu Val Lys Asp Phe Val Ser Phe  
 450 455 460

Ile Ser Lys His Ser Thr Asp Gly Leu Lys Gly Phe Ser Arg Asp Gly  
 465 470 475 480

Lys Lys Lys Lys Lys Thr Glu Leu  
 485

<210> 7

<211> 532

<212> PRT

<213> C. reinhard

<400> 7

Met Asn Arg Trp Asn Leu Leu Ala Leu Thr Leu Gly Leu Leu Val  
 1 5 10 15

Ala Ala Pro Phe Thr Lys His Gln Phe Ala His Ala Ser Asp Glu Tyr  
 20 25 30

Glu Asp Asp Glu Glu Asp Asp Ala Pro Ala Ala Pro Lys Asp Asp Asp  
 35 40 45

Val Asp Val Thr Val Val Thr Val Lys Asn Trp Asp Glu Thr Val Lys  
 50 55 60

Lys Ser Lys Phe Ala Leu Val Glu Phe Tyr Ala Pro Trp Cys Gly His  
 65 70 75 80

Cys Lys Thr Leu Lys Pro Glu Tyr Ala Lys Ala Ala Thr Ala Leu Lys  
 85 90 95

Ala Ala Ala Pro Asp Ala Leu Ile Ala Lys Val Asp Ala Thr Gln Glu  
 100 105 110

Glu Ser Leu Ala Gln Lys Phe Gly Val Gln Gly Tyr Pro Thr Leu Lys  
 115 120 125

Trp Phe Val Asp Gly Glu Leu Ala Ser Asp Tyr Asn Gly Pro Arg Asp  
 130 135 140  
 Ala Asp Gly Ile Val Gly Trp Val Lys Lys Lys Thr Gly Pro Pro Ala  
 145 150 155 160  
 Val Thr Val Glu Asp Ala Asp Lys Leu Lys Ser Leu Glu Ala Asp Ala  
 165 170 175  
 Glu Val Val Val Val Gly Tyr Phe Lys Ala Leu Glu Gly Glu Ile Tyr  
 180 185 190  
 Asp Thr Phe Lys Ser Tyr Ala Ala Lys Thr Glu Asp Val Val Phe Val  
 195 200 205  
 Gln Thr Thr Ser Ala Asp Val Ala Lys Ala Ala Gly Leu Asp Ala Val  
 210 215 220  
 Asp Thr Val Ser Val Val Lys Asn Phe Ala Gly Glu Asp Arg Ala Thr  
 225 230 235 240  
 Ala Val Leu Ala Thr Asp Ile Asp Thr Asp Ser Leu Thr Ala Phe Val  
 245 250 255  
 Lys Ser Glu Lys Met Pro Pro Thr Ile Glu Phe Asn Gln Lys Asn Ser  
 260 265 270  
 Asp Lys Ile Phe Asn Ser Gly Ile Asn Lys Gln Leu Ile Leu Trp Thr  
 275 280 285  
 Thr Ala Asp Asp Leu Lys Ala Asp Ala Glu Ile Met Thr Val Phe Arg  
 290 295 300  
 Glu Ala Ser Lys Lys Phe Lys Gly Gln Leu Val Phe Val Thr Val Asn  
 305 310 315 320  
 Asn Glu Gly Asp Gly Ala Asp Pro Val Thr Asn Phe Phe Gly Leu Lys  
 325 330 335  
 Gly Ala Thr Ser Pro Val Leu Leu Gly Phe Phe Met Glu Lys Asn Lys  
 340 345 350  
 Lys Phe Arg Met Glu Gly Glu Phe Thr Ala Asp Asn Val Ala Lys Phe  
 355 360 365  
 Ala Glu Ser Val Val Asp Gly Thr Ala Gln Ala Val Leu Lys Ser Glu  
 370 375 380  
 Ala Ile Pro Glu Asp Pro Tyr Glu Asp Gly Val Tyr Lys Ile Val Gly  
 385 390 395 400  
 Lys Thr Val Glu Ser Val Val Leu Asp Glu Thr Lys Asp Val Leu Leu  
 405 410 415  
 Glu Val Tyr Ala Pro Trp Cys Gly His Cys Lys Lys Leu Glu Pro Ile  
 420 425 430  
 Tyr Lys Lys Leu Ala Lys Arg Phe Lys Lys Val Asp Ser Val Ile Ile  
 435 440 445

Ala Lys Met Asp Gly Thr Glu Asn Glu His Pro Glu Ile Glu Val Lys  
 450 455 460

Gly Phe Pro Thr Ile Leu Phe Tyr Pro Ala Gly Ser Asp Arg Thr Pro  
 465 470 475 480

Ile Val Phe Glu Gly Gly Asp Arg Ser Leu Lys Ser Leu Thr Lys Phe  
 485 490 495

Ile Lys Thr Asn Ala Lys Ile Pro Tyr Glu Leu Pro Lys Lys Gly Ser  
 500 505 510

Asp Gly Asp Glu Gly Thr Ser Asp Asp Lys Asp Lys Pro Ala Ser Asp  
 515 520 525

Lys Asp Glu Leu  
 530

<210> 8  
 <211> 496  
 <212> PRT  
 <213> D. melano

<400> 8  
 Met Lys Phe Leu Ile Cys Ala Leu Phe Leu Ala Ala Ser Tyr Val Ala  
 1 5 10 15

Ala Ser Ala Glu Ala Glu Val Lys Val Glu Glu Gly Val Leu Val Ala  
 20 25 30

Thr Val Asp Asn Phe Lys Gln Leu Ile Ala Asp Asn Glu Phe Val Leu  
 35 40 45

Val Glu Phe Tyr Ala Pro Trp Cys Gly His Cys Lys Ala Leu Ala Pro  
 50 55 60

Glu Tyr Ala Lys Ala Ala Gln Gln Leu Ala Glu Lys Glu Ser Pro Ile  
 65 70 75 80

Lys Leu Ala Lys Val Asp Ala Thr Val Glu Gly Glu Leu Ala Glu Gln  
 85 90 95

Tyr Ala Val Arg Gly Tyr Pro Thr Leu Lys Phe Phe Arg Ser Gly Ser  
 100 105 110

Pro Val Glu Tyr Ser Gly Gly Arg Gln Ala Ala Asp Ile Ile Ala Trp  
 115 120 125

Val Thr Lys Lys Thr Gly Pro Pro Ala Lys Asp Leu Thr Ser Val Ala  
 130 135 140

Asp Ala Glu Gln Phe Leu Lys Asp Asn Glu Ile Ala Ile Ile Gly Phe  
 145 150 155 160

Phe Lys Asp Leu Glu Ser Glu Glu Ala Lys Thr Phe Thr Lys Val Ala  
 165 170 175

Asn Ala Leu Asp Ser Phe Val Phe Gly Val Ser Ser Asn Ala Asp Val  
 180 185 190  
 Ile Ala Lys Tyr Glu Ala Lys Asp Asn Gly Val Val Leu Phe Lys Pro  
 195 200 205  
 Phe Asp Asp Lys Lys Ser Val Phe Glu Gly Glu Leu Asn Glu Glu Asn  
 210 215 220  
 Leu Lys Lys Phe Ala Gln Val Gln Ser Leu Pro Leu Ile Val Asp Phe  
 225 230 235 240  
 Asn His Glu Ser Ala Ser Lys Ile Phe Gly Gly Ser Ile Lys Ser His  
 245 250 255  
 Leu Leu Phe Phe Val Ser Arg Glu Gly Gly His Ile Glu Lys Tyr Val  
 260 265 270  
 Asp Pro Leu Lys Glu Ile Ala Lys Lys Tyr Arg Asp Asp Ile Leu Phe  
 275 280 285  
 Val Thr Ile Ser Ser Asp Glu Glu Asp His Thr Arg Ile Phe Glu Phe  
 290 295 300  
 Phe Gly Met Asn Lys Glu Glu Val Pro Thr Ile Arg Leu Ile Lys Leu  
 305 310 315 320  
 Glu Glu Asp Met Ala Lys Tyr Lys Pro Glu Ser Asp Asp Leu Ser Ala  
 325 330 335  
 Glu Thr Ile Glu Ala Phe Leu Lys Lys Phe Leu Asp Gly Lys Leu Lys  
 340 345 350  
 Gln His Leu Leu Ser Gln Glu Leu Pro Glu Asp Trp Asp Lys Asn Pro  
 355 360 365  
 Val Lys Val Leu Val Ser Ser Asn Phe Glu Ser Val Ala Leu Asp Lys  
 370 375 380  
 Ser Lys Ser Val Leu Val Glu Phe Tyr Ala Pro Trp Cys Gly His Cys  
 385 390 395 400  
 Lys Gln Leu Ala Pro Ile Tyr Asp Gln Leu Ala Glu Lys Tyr Lys Asp  
 405 410 415  
 Asn Glu Asp Ile Val Ile Ala Lys Met Asp Ser Thr Ala Asn Glu Leu  
 420 425 430  
 Glu Ser Ile Lys Ile Ser Ser Phe Pro Thr Ile Lys Tyr Phe Arg Lys  
 435 440 445  
 Glu Asp Asn Lys Val Ile Asp Phe Asn Leu Asp Arg Thr Leu Asp Asp  
 450 455 460  
 Phe Val Lys Phe Leu Asp Ala Asn Gly Glu Val Ala Asp Ser Glu Pro  
 465 470 475 480  
 Val Glu Glu Thr Glu Glu Glu Glu Ala Pro Lys Lys Asp Glu Leu  
 485 490 495

<210> 9  
 <211> 481  
 <212> PRT  
 <213> C. parvum

<400> 9

Met Ile Gly Ile Arg Ser Leu Val Ser Ala Ala Phe Leu Gly Phe Ser  
 1 5 10 15

Cys Leu Ser Lys Val Val Leu Gly Gly Asp Glu Ala His Phe Ile Ser  
 20 25 30

Glu His Ile Thr Ser Leu Thr Ser Ser Asn Phe Glu Asp Phe Ile Lys  
 35 40 45

Ser Lys Glu His Val Ile Val Thr Phe Phe Ala Pro Trp Cys Gly His  
 50 55 60

Cys Thr Ala Leu Glu Pro Glu Phe Lys Ala Thr Cys Ala Glu Ile Ser  
 65 70 75 80

Lys Leu Ser Pro Pro Val His Cys Gly Ser Val Asp Ala Thr Glu Asn  
 85 90 95

Met Glu Leu Ala Gln Gln Tyr Gly Val Ser Gly Tyr Pro Thr Ile Lys  
 100 105 110

Phe Phe Ser Gly Ile Asp Ser Val Gln Asn Tyr Ser Gly Ala Arg Ser  
 115 120 125

Lys Asp Ala Phe Ile Lys Tyr Ile Lys Lys Leu Thr Gly Pro Ala Val  
 130 135 140

Gln Val Ala Glu Ser Glu Glu Ala Ile Lys Thr Ile Phe Ala Ser Ser  
 145 150 155 160

Ser Ser Ala Phe Val Gly Arg Phe Thr Ser Lys Asp Ser Ala Glu Tyr  
 165 170 175

Ala Val Phe Glu Lys Val Ala Ser Gly His Arg Glu His Asn Tyr Ala  
 180 185 190

Phe Ile Ala Phe Phe Gln Glu Gly Glu Gln Lys Leu Glu Val Leu His  
 195 200 205

Lys Asp Glu Glu Pro Val Ser Leu Pro Met Pro Lys Thr Val Glu Glu  
 210 215 220

Leu Glu Ala Lys Ile Ser Ile Met Asn Val Pro Leu Phe Ser Ala Ile  
 225 230 235 240

Ser Ala Glu Asn Tyr Ser Leu Tyr Met Ser Arg Glu Gly Tyr Thr Pro  
 245 250 255



Gly Ser Val Val Leu Thr Arg Thr Ser Pro Ser Met Leu Gln Thr Leu  
 260 265 270  
 Glu Arg Leu Gln Leu Ile Thr Glu Lys Ser Met Pro Leu Phe Ser Leu  
 275 280 285  
 Asp Thr Glu Gln Phe Gly Ser His Ala Thr Gln His Leu Leu Ile Glu  
 290 295 300  
 Lys Phe Pro Gly Leu Val Ile Gln Ser Val Asn Val Pro Ser Ile Arg  
 305 310 315 320  
 Tyr Met Tyr Gly Pro Ala Lys Phe Asp Ser Val Glu Pro Leu Lys Glu  
 325 330 335  
 Phe Met Lys Gln Val Ser Glu Gly Lys His Glu Leu Ser Ile Lys Ser  
 340 345 350  
 Glu Pro Ile Pro Ala Glu Gln Ser Gly Pro Val Thr Val Val Val Gly  
 355 360 365  
 Lys Thr Phe Glu Glu Ile Val Phe Arg Ser Asp Lys Asp Val Leu Leu  
 370 375 380  
 Glu Ile Tyr Ala Gln Trp Cys Gly His Cys Lys Asn Leu Glu Pro Ile  
 385 390 395 400  
 Tyr Asn Gln Leu Gly Glu Glu Tyr Lys Asp Asn Asp Lys Val Val Ile  
 405 410 415  
 Ala Lys Ile Asn Gly Pro Gln Asn Asp Ile Pro Tyr Glu Gly Phe Ser  
 420 425 430  
 Pro Arg Ala Phe Pro Thr Ile Leu Phe Val Lys Ala Gly Thr Arg Thr  
 435 440 445  
 Pro Ile Pro Tyr Asp Gly Lys Arg Thr Val Glu Ala Phe Lys Glu Phe  
 450 455 460  
 Ile Ser Glu His Ser Ser Phe Pro Gln Glu Lys Glu Ser Arg Asp Glu  
 465 470 475 480  
 Leu

&lt;210&gt; 10

&lt;211&gt; 508

&lt;212&gt; PRT

&lt;213&gt; Homo sapiens

&lt;400&gt; 10

Met Leu Arg Arg Ala Leu Leu Cys Leu Ala Val Ala Ala Leu Val Arg  
 1 5 10 15  
 Ala Asp Ala Pro Glu Glu Glu Asp His Val Leu Val Leu Arg Lys Ser  
 20 25 30

Asn Phe Ala Glu Ala Leu Ala Ala His Lys Tyr Leu Leu Val Glu Phe  
 35 40 45  
 Tyr Ala Pro Trp Cys Gly His Cys Lys Ala Leu Ala Pro Glu Tyr Ala  
 50 55 60  
 Lys Ala Ala Gly Lys Leu Lys Ala Glu Gly Ser Glu Ile Arg Leu Ala  
 65 70 75 80  
 Lys Val Asp Ala Thr Glu Glu Ser Asp Leu Ala Gln Gln Tyr Gly Val  
 85 90 95  
 Arg Gly Tyr Pro Thr Ile Lys Phe Phe Arg Asn Gly Asp Thr Ala Ser  
 100 105 110  
 Pro Lys Glu Tyr Thr Ala Gly Arg Glu Ala Asp Asp Ile Val Asn Trp  
 115 120 125  
 Leu Lys Lys Arg Thr Gly Pro Ala Ala Thr Thr Leu Pro Asp Gly Ala  
 130 135 140  
 Ala Ala Glu Ser Leu Val Glu Ser Ser Glu Val Ala Val Ile Gly Phe  
 145 150 155 160  
 Phe Lys Asp Val Glu Ser Asp Ser Ala Lys Gln Phe Leu Gln Ala Ala  
 165 170 175  
 Glu Ala Ile Asp Asp Ile Pro Phe Gly Ile Thr Ser Asn Ser Asp Val  
 180 185 190  
 Phe Ser Lys Tyr Gln Leu Asp Lys Asp Gly Val Val Leu Phe Lys Lys  
 195 200 205  
 Phe Asp Glu Gly Arg Asn Asn Phe Glu Gly Glu Val Thr Lys Glu Asn  
 210 215 220  
 Leu Leu Asp Phe Ile Lys His Asn Gln Leu Pro Leu Val Ile Glu Phe  
 225 230 235 240  
 Thr Glu Gln Thr Ala Pro Lys Ile Phe Gly Gly Glu Ile Lys Thr His  
 245 250 255  
 Ile Leu Leu Phe Leu Pro Lys Ser Val Ser Asp Tyr Asp Gly Lys Leu  
 260 265 270  
 Ser Asn Phe Lys Thr Ala Ala Glu Ser Phe Lys Gly Lys Ile Leu Phe  
 275 280 285  
 Ile Phe Ile Asp Ser Asp His Thr Asp Asn Gln Arg Ile Leu Glu Phe  
 290 295 300  
 Phe Gly Leu Lys Lys Glu Glu Cys Pro Ala Val Arg Leu Ile Thr Leu  
 305 310 315 320  
 Glu Glu Glu Met Thr Lys Tyr Lys Pro Glu Ser Glu Glu Leu Thr Ala  
 325 330 335  
 Glu Arg Ile Thr Glu Phe Cys His Arg Phe Leu Glu Gly Lys Ile Lys  
 340 345 350

Pro His Leu Met Ser Gln Glu Leu Pro Glu Asp Trp Asp Lys Gln Pro  
355 360 365

Val Lys Val Leu Val Gly Lys Asn Phe Glu Asp Val Ala Phe Asp Glu  
370 375 380

Lys Lys Asn Val Phe Val Glu Phe Tyr Ala Pro Trp Cys Gly His Cys  
385 390 395 400

Lys Gln Leu Ala Pro Ile Trp Asp Lys Leu Gly Glu Thr Tyr Lys Asp  
405 410 415

His Glu Asn Ile Val Ile Ala Lys Met Asp Ser Thr Ala Asn Glu Val  
420 425 430

Glu Ala Val Lys Val His Ser Phe Pro Thr Leu Lys Phe Phe Pro Ala  
435 440 445

Ser Ala Asp Arg Thr Val Ile Asp Tyr Asn Gly Glu Arg Thr Leu Asp  
450 455 460

Gly Phe Lys Lys Phe Leu Glu Ser Gly Gly Gln Asp Gly Ala Gly Asp  
465 470 475 480

Asp Asp Asp Leu Glu Asp Leu Glu Glu Ala Glu Glu Pro Asp Met Glu  
485 490 495

Glu Asp Asp Asp Gln Lys Ala Val Lys Asp Glu Leu  
500 505